Santa Cruz Watershed

Watershed Description

This watershed is composed of two hydrological areas: 1) the Santa Cruz River which flows north to the Gila River, and 2) a series of streams that flow south and eventually into the Rio Magdalena and Rio Sonoyta in Mexico. Most of the population in this 11,100 square mile watershed is clustered around metropolitan Tucson (approximately 844,000 people in the 2000 census) and Nogales in Arizona and Sonora Mexico (370,000 people, mostly in Mexico). Land ownership is approximately: 40% Tribal, 25% federal, 20% private, and 15% state.

Grazing is the dominant land use, with irrigated crop production near streams. Active and abandoned mines are scattered throughout the watershed. There are eight wilderness areas along with national forest and national monuments with restricted land uses.

Elevations range from 9,156 feet (above sea level) at Mount Lemmon to about 1,100 feet at the Gila River. Expect for a string of high mountains in the east, most of the watershed is below 5,000 feet, with low Sonoran desert flora and fauna and warmwater aquatic communities where perennial waters exist.

Water Resources

This watershed obtains about 15 inches of rain and up to 1 inch of snow per year. Ground water pumping has eliminated natural perennial flow in most of the mainstem Santa Cruz River. Treated wastewater effluent provides perennial flow below discharges from the cities of Nogales and Tucson.

An estimate of surface water resources in the Santa Cruz Watershed is provided in the following table. Waters on Tribal lands are not assessed by ADEQ; therefore, those statistics are shown separately.

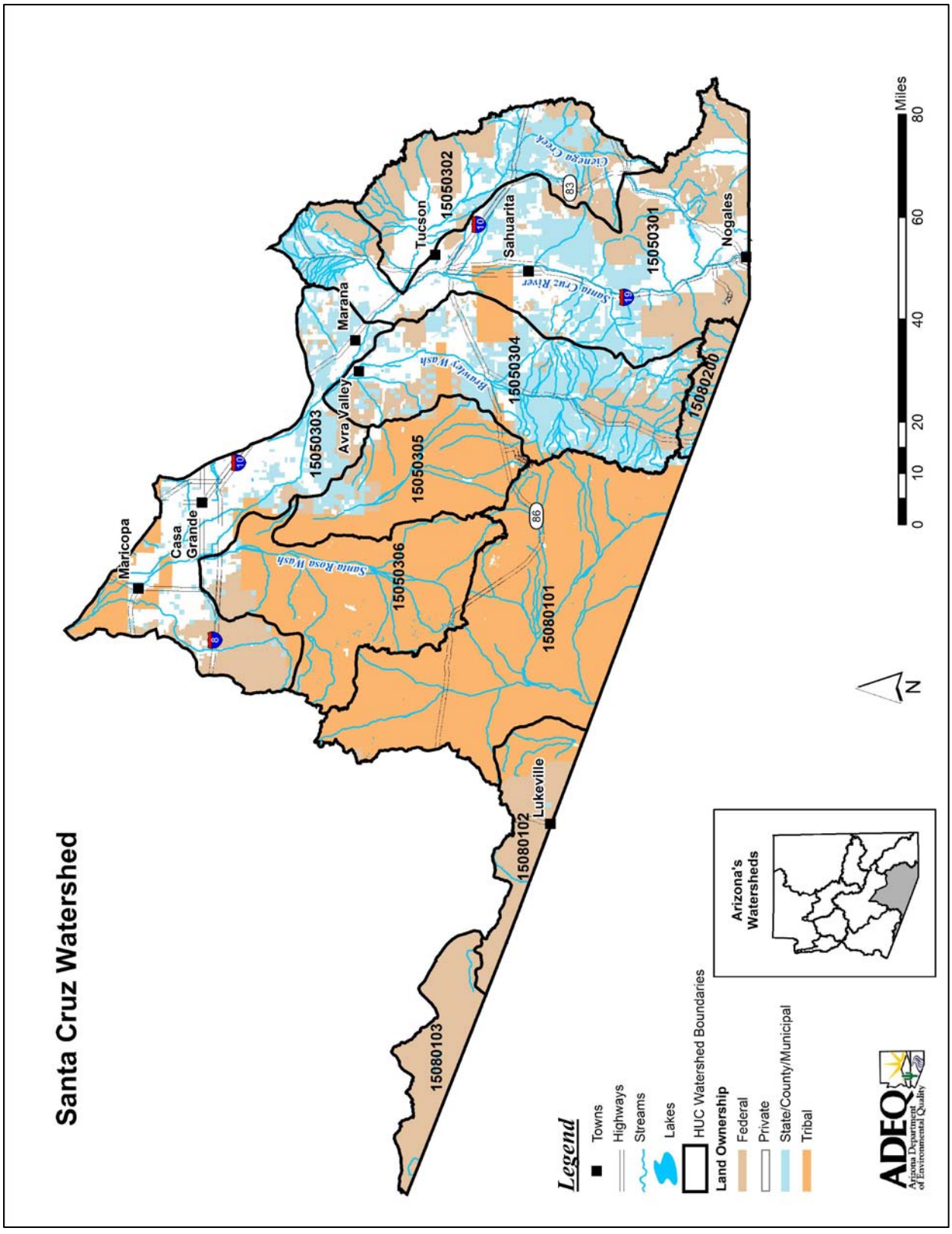
Estimated Surface Water Resources in the Santa Cruz Watershed

	Perennial	Intermittent	Ephemeral
Stream miles	85	500	7,245
	Perennial	Non-perennial	
Lake acres	1,366	0	

On Tribal Land – Not Assessed

	Perennial	Intermittent	Ephemeral
Stream miles	0	50	3,795
	Perennial	Non-perennial	
Lake acres	9,523	11,119	

Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters. Estimated miles and acres are based on USGS digitized hydrology at 1:100,000 and have been rounded to the nearest 5 miles or 5 acres.


Santa Cruz Watershed
Maricopa
Casa Grande
Marana
Avra Valley
Tucson
Sahuarita
Nogales
Lukeville
15050303
15050305
15050306
15050304
15050302
15050301
15080200
15080101
15080102
15080103
Santa Rosa Wash
Brawley Wash
Cienega Creek
Santa Cruz River
Legend
Towns
Highways
Streams
Lakes
HUC Watershed Boundaries
Land Ownership
Federal
Private
State/County/Municipal
Tribal
Arizona's Watersheds
N
0 10 20 40 60 80
Miles
ADEQ
Arizona Department of Environmental Quality

Watershed Partnerships

- **The Friends of the Santa Cruz River (FOSCR)**
  FOSCR focuses on the upper Santa Cruz River near Nogales Arizona/Mexico. Its mission is to ensure continued flow in the river, promote the highest water quality achievable, and protect and restore the riparian ecosystem and diversity of live along the stream. It accomplished this goal through education, partnerships, and advocacy for the benefit of present and future generations. They meet monthly on the 3rd Thursday. Contact Sherry Sass (President) at (520) 398-9093 or admin@friendsofsantacruzriver.org, or sushis@aol.com.

- **Pima County Association of Government's (PAG) Watershed Planning Subcommittee.**
  This group provides a forum for exchanging information among stakeholders, concerning projects that may affect water quality or quantity in Pima County (much of the Santa Cruz Watershed). Pubic participation is encouraged. No regularly scheduled meetings. Information concerning the group's activities can be obtained at their website: http://www.pagnet.org/WQ/participation.htm, at wq@pagnet.org; or (520) 792-1093.

Special Studies and Water Quality Improvement Projects

Total Maximum Daily Load Analyses – The following TMDL analyses have been completed, are ongoing, or are scheduled to be completed in this watershed. Further information about the status of these investigations or a copy of the TMDL, if completed, can be obtained at ADEQ's website: www.azdeq.gov.

- Alum Gulch and a tributary (Humboldt Canyon) are impaired by cadmium, copper, zinc, and low pH (acidity). Pollution by these metals and acid mine drainage pose a risk to aquatic life and wildlife. TMDL analyses were completed and approved in 2003. Based on this study, primarily loading originates from the World's Fair Mine area and Humboldt Canyon with relatively minor contributions from Trench Camp Mine and the January Adit. It appears that the remediation efforts at Trench Camp and the January Adit have been relatively successful. To achieve standards, ADEQ will be working with landowners and interested stakeholders to implement the following remediation actions and strategies recommended in the TMDL:
  - Remove mine residue dumps from the stream banks,
  - Remove mine-waste sediments from the streambeds, and
  - Isolate and treat mine-impacted ground water discharges (springs and adits).

- Arivaca Lake is impaired by mercury.
  A fish consumption advisory concerning mercury in fish tissue has been issued at this lake because mercury poses a health problem to humans. Mercury also poses risks to other species that eat the fish. EPA collaborated with ADEQ and completed a mercury TMDL in 1999. The primary sources of mercury were identified as: atmospheric deposition (particulates in the air) and natural deposition from local substrates. Because atmospheric deposition is not readily controllable, and the primary land use is grazing, improvements in livestock management to reduce soil erosion were targeted in the TMDL implementation plan. ADEQ is working with interested landowners and stakeholders to implement these improvements.

- Harshaw Creek is impaired by copper and low pH (acidity).
  Copper and acid mine drainage may negatively impact aquatic life and wildlife. TMDL loading analyses were completed in 2003. This report identified abandoned or inactive mines that were the primary sources of the copper and acid mine waste. To achieve standards, ADEQ will be working with landowners and interested stakeholders to implement the following remediation actions and strategies recommended in the TMDL:
  - Remove mine residue dumps from the stream banks,
  - Remove mine-waste sediments from the streambeds, and
  - Isolate and treat mine-impacted ground water discharges (springs and adits).

- Lakeside Lake in Tucson is impaired by nutrients, ammonia, high pH, and low levels of dissolved oxygen. Excess nutrients (nitrogen) may result in low dissolved oxygen and high pH and potentially toxic algal blooms and fish kills. High levels of ammonia may also pose a risk to aquatic life. TMDL analyses were completed in 2005 and indicated that the water sources supplying the lake were the primary source of nutrients to the lake. Lakeside

Lake receives secondary-treated reclaimed effluent, ground water, Central Arizona Project (CAP) water from the Colorado River, and occasional storm water runoff from Atterbury Wash.

ADEQ has been working with the city of Tucson, Pima County Wastewater Management Department, and other interested stakeholders to mitigate these problems. The city of Tucson has been testing aerators that physically increase dissolved oxygen levels in the water column. However, increased agitation and vertical mixing stimulated greater algal productivity, high pH levels, and did not reduce the ammonia concentration. Tucson is also testing the use of alum to reduce phosphorus loading in the lake.

- Three R (3R) Canyon and Cox Gulch are impaired by beryllium, cadmium, copper, zinc, and low pH (acidity). These metals and acid mine drainage represent a risk to aquatic and wildlife. TMDLs were completed in 2003 and quantified contributions from 3R Mine and unnamed springs. However, a Phase II TMDL is needed to determine if there are other significant contributions in the basin. To achieve standards, ADEQ will be working with landowners and interested stakeholders to implement the following remediation actions and strategies recommended in the TMDL:
    - Remove mine residue dumps from the stream banks,
    - Remove mine-waste sediments from the streambeds, and
    - Isolate and treat mine-impacted ground water discharges (springs and adits).

- Pena Blanca Lake is impaired by mercury.
  A fish consumption advisory concerning mercury in fish tissue has been issued at this lake because mercury poses a health problem to humans. Mercury also poses risks to other species that eat the fish. EPA collaborated with ADEQ and completed a mercury TMDL in 1999. The study identified three sources of mercury: atmospheric deposition (particulates in the air), St. Patrick Mine ball mill site, and generalized natural deposition from local substrates. To meet standards, the TMDL analysis and implementation plan indicated that the tailings and sediment should be removed from the ball mill site. ADEQ is to conduct further monitoring on fish tissue to determine whether these measures were sufficient.

- Nogales Wash is impaired by ammonia, *Escherichia coli*, copper, and chlorine.
  Exceedances of the *E. coli* standard may represent a significant public health concern if people are swimming or even wading in the water. Ammonia, chlorine and copper pose a threat to aquatic life and wildlife. Wastewater infrastructure has deteriorated in Mexico and must be replaced. To protect the human health, chlorine is added directly to the wash continuously via drip systems and manual introduction of chlorine tables. Chlorine residuals are monitored daily in an attempt to keep chlorine residuals at or above 1 mg/L at the US and Mexico border (which is 100 times above the standard for aquatic life use). Although these conditions pose significant threats to human health and aquatic life, actions to correct the situation are dependent on ongoing international negotiations between several government officials (representing the United States, Arizona, Mexico, the cities of Nogales Arizona and Nogales Sonora, and the Mexican state of Sonora). The source loadings are known and the technical means to correct the problem have been determined. These TMDLs will be developed if needed after facility upgrades are completed.

- Santa Cruz River from Mexico to the Nogales International Wastewater Treatment Plant discharge is impaired by *Escherichia coli* bacteria.
  Exceedances of the *E. coli* standard may represent a significant public health concern if people are swimming or even wading in the water. Completing this TMDL may be complex due to probable sources in Mexico and intermittent stream flow. Drought conditions have slowed collection of adequate data to determine source loadings. A TMDL will be initiated when flow resumes.

- Sonoita Creek is impaired by zinc in the 14-mile segment just above its confluence with the Santa Cruz River. The federally protected Gila topminnow occurs in this reach and could be negatively impacted by dissolved zinc. Sources of the zinc have not been investigated but are likely related to transport of zinc during storm flows from its tributaries (e.g., Alum Gulch and 3R Canyon). Monitoring will be used to determine if strategies implemented on these tributaries reduce zinc transport sufficiently to eliminate exceedances on Sonoita Creek.

- Parker Canyon Lake is impaired by mercury.
  A fish consumption advisory concerning mercury in fish tissue has been issued at this lake because mercury poses a health problem to humans. Mercury also poses risks to other species that eat the fish. A TMDL is scheduled to be initiated in 2006.

Water Quality Improvement Grant Projects – ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at: http://www.azdeq.gov/environ/water/watershed/fin.html.

- **BMPs to Control Sedimentation on the Santa Cruz River Project**
  The Coronado Resource Conservation and Development Area (2000)
  Implement management practices to control sedimentation along a thousand feet of the Santa Cruz River.

- **Riverfront Residence Green Roof Project**
  A private consultant (2001)
  Install a 3400 square feet "green roof" (waterproofing, soil, and vegetative cover) to demonstrate how to mitigate impacts of urban runoff by slowing and absorbing runoff from the roof. The landscaping acts as a filter strip, minimizing pollutant transport. The reduction of runoff should also reduce soil erosion on-site and downstream.

- **Best Management Practices: A Balancing Act Project**
  Pima Natural Resource Conservation District (2001)
  Demonstrate agricultural practices that will minimize crop amendment (fertilizers, pesticides) loss. Losses frequently occur due to deep percolation, erosion, runoff, evaporation, and drift.

- **Palo Alto Runoff Control Project**
  Coronado Resource Conservation and Development Area (2002)
  Implement Best Management Practices on high priority areas in the Alter Valley subwatershed to control runoff that contributes sediment to the Santa Cruz River system. The objective is to reduce sediment production from gully erosion and headcutting on the Palo Alto Ranch along Alter Wash.

- **Enhanced Implementation of Deferred Rotational Grazing on C6 Ranch Project**
  Rancher in collaboration with the University of Arizona Extension Service (2002)
  Project will build fences to exclude livestock, develop alternative water sources for livestock, construct erosion control dams in gullies, and implement a comprehensive plan for monitoring effectiveness. Project is also a teaching opportunity.

- **Santa Cruz River Riparian Re-vegetation Project**
  Montessori De Santa Cruz Charter School (2003)
  Repair riparian habitat and provide community education and outreach. This is a collaborative project between the Montessori School, Tumacacori National Historical park Service, and the Friends of the Santa Cruz River.

- **Santa Cruz River Sediment Control Project**
  Coronado Resource Conservation and Development Area (2004)
  Install 800 feet Kellner jacks and revegetate with native species along the south river road bank of the Santa Cruz River to improve stream bank stability.

- **Redrock Canyon and Upper Santa Cruz Watershed Improvement Project**
  Coronado Resource Conservation and Development Area (2005 and 2006).
  Work with the five grazing allotments in the Red Rock Canyon (a tributary to Sonoita Creek) control erosion and sediment transport by implementing best grazing practices. Project excluded cattle from riparian areas using fencing, revegetation of riparian areas, and development of alternative sources of water.

Water Protection Fund Projects – The following Water Protection Fund Projects were awarded by the Arizona Department of Water Resources. More information about these funds or projects can be obtained from the ADWR web site at: http//www.azwater.gov.

- **Riparian Restoration on the Santa Fe Ranch Project**
  The Coronado Resource Conservation and Development Area (2000)
  Revegetate degraded riparian areas along the Santa Cruz River. The project would erect fencing to exclude cattle. The project would also develop a teacher's guide to riparian restoration, provide site tours, and a photo display of techniques used.

- **Tucson Audubon Society's North Simpson Ranch Riparian Recovery Project**
  Tucson Audubon Society (2000 and 2004)
  Increase vegetative diversity and increase stream bank stability along the Santa Cruz River. Management measures included rainwater harvesting, mulching, and fencing out cattle and unauthorized vehicles. The project would also provide a long-range strategy for habitat connectivity, human access, and a sustainable riparian habitat.

- **Riparian Restoration on the San Xavier District Project**
  San Xavier District of the Tohono O'odham Indian Community (2002)
  This was a cooperative riparian restoration and management project sponsored by the San Xavier District of the Tohono O'odham, Mark Briggs (an ecologist), the Sonoran Joint Venture, and the U.S. Fish and Wildlife Service.

- **Esperanza Ranch Riparian Restoration Project**
  The Tucson Audubon Society (2005)
  Restore the riparian area in a 300 acre ranch along the Santa Cruz River and Chivas Wash.

U.S. Army Corps of Engineers' Ecosystem Restoration Projects – Ecosystem restoration, environmental stewardship, and radioactive site cleanup projects are funded through the annual federal Energy and Water budget. The purpose of ecosystem restoration is to re-establish attributes of a natural functioning and self-regulating system.

- **Ed Pastor Kino Environmental Restoration Project**
  The Tucson (Ajo) Detection Basin and Tucson Diversion Channel has been expanded to include 141 acres, including: 50 acres of wetlands, 12 acres of wildlife and open water areas, and 38 acres of mesquite bosque and ephemeral grassland. The project uses stormwater runoff and reclaimed water.

- **Agua Caliente Spring**
  The project has multiple objectives that will improve ecosystem function, restore the natural structure and function of the spring, improve habitat, and create education and recreational opportunities. The recommended plan would keep one pond and create a native cienaga-type wetland (eliminating pond 2 and 3).

- **Rillito River Riparian Area (Swan Wetlands)**
  The plan is to restore riparian vegetative communities along the south bank of the Rillito River, between Craycroft Road and Columbus Boulevard (61 acres), to a more natural state. Improvements in the riparian condition will increase functional habitat and minimize sediment and organic accumulation.

- **Paseo de las Iglesias**
  The objective is to increase the functional riparian and floodplain habitat along the Santa Cruz River, the West Branch of the Santa Cruz River, and Los Reales Road. Increased riparian area will increase wildlife habitat, provide passive recreation opportunities, reduce flood damage, reduce bank erosion and sedimentation, and improve water quality. Irrigated planting of mesquite and riparian shrub will be placed on terraces above the low flow channel and in the historic floodplain, with small areas of emergent marsh and cottonwood-willow habitat. Water will be provided by water harvesting and reclaimed wastewater.

- **El Rio Antiguo**
  Restore riparian vegetative communities along the Rillito River, between Craycroft Road and Campbell Avenue. Cottonwood-willow, mesquite, shrub and grasses will be planted in the channel, in tributary mouths, and in water harvesting basins on the tributaries. A culvert and pipeline will allow water to flow behind the soil cement during 2-year and higher flood events to provide water to riparian pant communities along the north bank in the upstream study area.

- **Tres Rios del Norte**
  This project is located along the Santa Cruz River between Prince Road to Sanders Road, West Moore Road and West Avra Valley Road. It will restore 19 miles of wetland and riparian vegetative communities along the Santa Cruz River and its adjacent floodplains. The restoration would vastly improve mesquite, cottonwood-willow, and emergent wetland habitats to a condition supportive of wildlife, and for the benefit of residents and visitors to the area.

Other Water Quality Studies – The following additional water quality related studies were completed since 2000 in this watershed:

- ***The Water Quality of Priority Streams in Pima County***
  Pima Association of Governments (2002)
  This report compiles the existing water quality data and other pertinent information for the streams that have been identified as priorities in Pima County.

- ***Water Issues of the Arizona - Mexico Border: The Santa Cruz, San Pedro, and Colorado Rivers.***
  Terry W. Sprouse, University of Arizona, Water Resources Research Center (2005)
  Summary of water quality and water quantity issues facing this region.

- ***Water Quality Data for Selected National Park Units, Southern and Central Arizona and West-Central New Mexico, Water Years 2003 and 2004***
  U.S. Geological Survey in cooperation with the National Park Service (2005)
  Field measurements and water samples were collected at springs, mine adits, streams, and wells at 30 sites in 9 park units in 2003-2004 to provide baseline (ambient) water quality information. Only 24 of the 30 sites were sampled three times due to drought conditions and lack of water during parts of the year. Analyses of data collected at these sites indicated:
    - Dissolved uranium was elevated at Williams Spring in Organ Pipe National Monument at 32 µg/L; and
    - Concentrations of nitrate and nitrite (nutrients) were elevated at Dripping Springs in Organ Pipe Cactus National Monument, Fern Grotto on Coronado National Memorial, and Wild Horse Mine in the Tucson Mountain District of Saguaro National Park.

- ***Simulated Water Level Responses, Ground Water Fluxes, and Storage Changes for Recharge Scenarios along Rillito Creek, Tucson, Arizona***
  John P. Hoffmann and S.A. Leake, U.S. Geological Survey (2004)
  The amount of water currently recharging the aquifers within the Tucson area is insufficient to meet current and projected demands. Ground water in this area has dropped more than 200 feet since the middle of the 20th Century (causing streams to become ephemeral). A local ground water flow model is used to simulate four recharge scenarios along Rillito Creek in northern Tucson to evaluate mitigating effects on ground water deficits and water level declines in Tucson's Central Well Field.

- ***Assessment of Selected Inorganic Constituents in Streams in the Central Arizona Basins Study Area, Arizona and Northern Mexico, through 1998***
  David Anning – U.S. Geological Survey, National Water Quality Assessment Program (2003)
  Inorganic chemical data (dissolved solids, suspended sediment, and nutrients) and stream properties (temperature, pH, dissolved oxygen) were analyzed to assess water quality, determine natural and human factors affecting water quality, and compute stream loads.

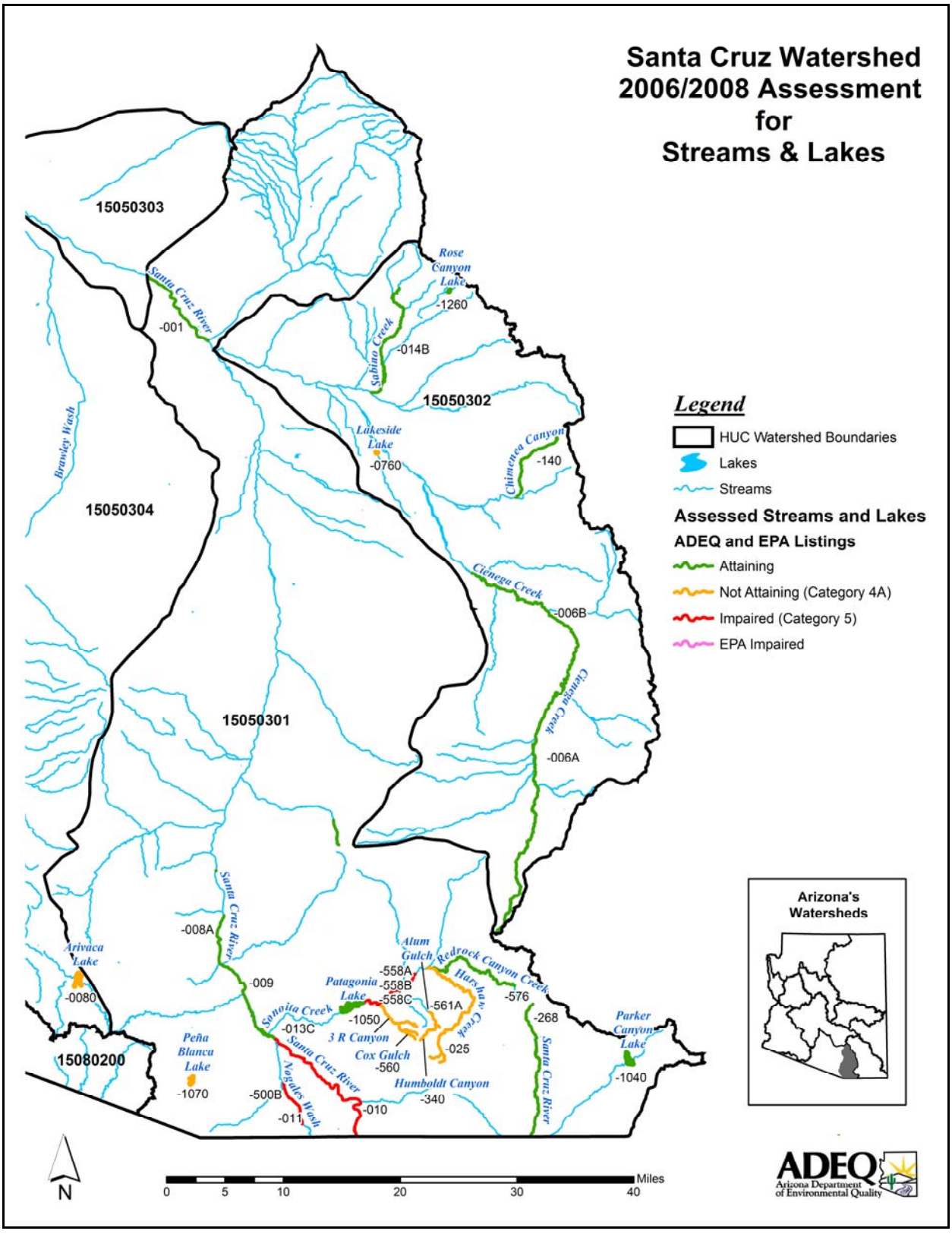
- ***Border Crossings – Water and Wastewater at the International Boundary***
  R.G. Charles Graf and Craig Tinney (ADEQ) and Tom Konner (EPA Region IX)
  September/October 2005 Southwest Hydrology (2005)
  This article describes the problems and progress being made in addressing water quality and wastewater infrastructure along the Mexican border with California and Arizona for seven key populations centers: San Diego/Tijuana, Tecate, Calexico/Mexicali, San Luis/San Luis Rio Colorado (Yuma area), Nogales, Naco/Bisbee, and Douglas/Agua Prieta.

Assessments

The Santa Cruz Watershed can be separated into the following drainage areas (subwatersheds):

15050301	Upper Santa Cruz
15050302	Pantano Wash
15050302	Lower Santa Cruz
15050304	Brawley Wash
15050305	Aguirre Wash
15050306	Santa Rosa Wash
15080101	San Simon Wash (On Tribal Land – Not Assessed)
15080102	Rio Sonoyta
15080103	Tule Desert
15080200	Rio Asuncion

These drainage areas and the surface waters assessed as "attaining" or "impaired" are illustrated on the following watershed map. Methods used to complete these assessments are described in the "Surface Water Assessment Methods and Technical Support" document (2006).


Santa Cruz Watershed
2006/2008 Assessment
for
Streams & Lakes
15050303
15050304
15050301
15050302
15080200
Rose Canyon Lake
-1260
Santa Cruz River
-001
Sabino Creek
-014B
Brawley Wash
Lakeside Lake
-0760
Chimenea Canyon
-140
Cienega Creek
-006B
Cienega Creek
-006A
Santa Cruz River
-008A
Arivaca Lake
-0080
-009
Patagonia Lake
Sonoita Creek
-013C
Peña Blanca Lake
-1070
Santa Cruz River
Alum Gulch
-558A
-558B
-558C
3 R Canyon
Cox Gulch
-560
Humboldt Canyon
-340
Redrock Canyon Creek
-576
Harshaw Creek
-561A
-1050
-025
-268
Parker Canyon Lake
-1040
Santa Cruz River
Potrero Creek
-500B
-011
-010
Legend
HUC Watershed Boundaries
Lakes
Streams
Assessed Streams and Lakes
ADEQ and EPA Listings
Attaining
Not Attaining (Category 4A)
Impaired (Category 5)
EPA Impaired
Arizona's Watersheds
N
0
5
10
20
30
40
Miles
ADEQ
Arizona Department of Environmental Quality

ALUM GULCH From headwaters to 312820 / 1104351 (to beginning of intermittent flow) 15050301 – 561A 0.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired AgL -- Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	TMDL completed in 2003. Need to implement improvements at mining sites.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 01/11/2000; 06/08/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At January Mine Adit SCALG005.45 102952	USGS Ambient	1 total and 2 dissolved metals: Cadmium, copper, zinc 1 dissolved only: Barium, beryllium, boron, chromium, lead, manganese, nickel, silver	2 samples: Dissolved oxygen and pH	
Below January Mine Adit, above Humboldt Canyon SCALG005.35 100838	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Cadmium	50 µg/L AgL	01/11/2000 – 170 µg/L 06/08/2004 – 208 µg/L	Remains impaired -- Exceeded in 2 of 2 samples (Binomial)
Copper (dissolved)	85.8 µg/L at >400 mg/L hardness A&We acute	01/11/2000 – 400 µg/L	Remains impaired -- Exceeded once in the last 3 years of monitoring
Lead	15 µg/L PBC	06/08/2004 – 143 µg/L	Inconclusive – Exceeded in only sample tested for lead concentration. (Binomial)
Zinc (dissolved)	3,599 µg/L at >400 mg/L hardness A&We acute	01/11/2000 – 56,000 µg/L 06/08/2004 – 99,300 µg/L	Remains impaired -- Exceeded twice in the last 3 years of monitoring
Zinc (total)	25,000 µg/L AgL	01/11/2000 – 56,000 µg/L 06/08/2004 – 99,300 µg/L	Remains impaired -- Exceeded in 2 of 2 samples (Binomial)
pH	<6.5 SU A&We, PBC, AgL	01/11/2000 – 4.7 SU 06/08/2004 – 4.5 SU	Remains impaired -- Exceeded in 2 of 2 samples (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead	Insufficient core parameters	Insufficient monitoring events	
MONITORING RECOMMENDATIONS		Medium Priority – Collect samples during crucial conditions to determine effectiveness of improvements at mine sites in this watershed once improvements are completed. Collect additional lead samples due to exceedance. Collect core parameters to represent at least 3 seasons during an assessment period.	

ALUM GULCH From 312820 / 1104351 to 312917 / 1104425 (intermittent flow) 15050301 – 561B 1.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Impaired AgL – Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	TMDL completed in 2003. Need to implement improvements at mining sites.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 01/11/2000		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below World's Fair Mine SCALG004.45 100870	ADEQ TMDL	1 total and dissolved metal samples: Cadmium, copper, zinc	1 sample: Dissolved oxygen and pH	

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Cadmium	50 µg/L – AgL 84 µg/L – FBC	01/11/2000 – 290 µg/L	Remains impaired – Exceeded criterion in only sample collected. (Binomial)
Cadmium (dissolved)	19.1 µg/L at >400 mg/L hardness A&Ww acute	01/11/2000 – 220 µg/L	Remains impaired – Exceeded criterion in only sample collected.
Copper	500 µg/L – AgL 1300 µg/L – FBC	01/11/2000 – 2100 µg/L	Remains impaired – Exceeded criterion in only sample collected. (Binomial)
Copper (dissolved)	49.6 µg/L at >400 mg/L hardness A&Ww acute	01/11/2000 – 2000 µg/L	Remains impaired – Exceeded criterion in only sample collected.
Zinc	25,000 µg/L AgL	01/11/2000 – 53,000 µg/L	Remains impaired – Exceeded criterion in only sample collected. (Binomial)
Zinc (dissolved)	Calculated as 379.3 µg/L A&Ww acute	01/11/2000 – 54,000 µg/L	Remains impaired – Exceeded criterion in only sample collected.
pH	<6.5 SU A&Ww, FBC, AgL	01/11/2000 – 3.2 SU	Remains impaired – Exceeded criterion in only sample collected. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient monitoring events	
MONITORING RECOMMENDATIONS		Medium Priority – Collect samples during crucial conditions to determine effectiveness of improvements at mine sites in this watershed once improvements are completed. Collect core parameters to represent at least 3 seasons during an assessment period.	

ARIVACA CIENEGA 15050304 -- 0001 3 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 05/15/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake SCACL-USGS 101583	USGS Ambient	1 dissolved metal only: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, uranium, and zinc. (0 total metals)	1 sample: Dissolved oxygen and pH	1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Missing all core parameters	Insufficient sampling events.	
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period.	

ARIVACA LAKE 15050304 -- 0080 118 Acres	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Inconclusive FBC – Attaining FC – Impaired AgI -- Attaining AgL – Attaining	Category 4A Not attaining	Mercury in fish tissue	Mercury TMDL completed in 1999

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/19/2000 – 05/21/2001; 09/17/2003; 04/06/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam SCARI-A 100000 (main site sampled)	ADEQ, U of A, AGFD Ambient	6-7 total and 4 dissolved: Cadmium, chromium, lead, nickel, zinc 7 total and 1 dissolved metals: Antimony, arsenic, barium, beryllium, boron, copper, manganese, mercury	6-7 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 7 Fluoride 3 Total dissolved solids 7 Turbidity
Mid lake SCARI-B 101734	U of A Ambient			
At boat ramp SCARI-C 102534	AGFD Ambient			
At Chimney Canyon SCARI-CHIM 102535	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	09/17/2003 – 4.2 mg/L	Attaining – Did not meet dissolved oxygen criteria in 2 of 10 samples (1 of 7 sampling events). (Binomial)
Selenium	2.0 µg/L A&Ww chronic	05/21/2001 – 4.0 µg/L	Inconclusive – Exceeded 1 time during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium	Insufficient dissolved copper needed to assess A&W		Lab detection limits for selenium and dissolved metals (cadmium, copper, lead, and mercury) were higher than A&W chronic criteria.

MONITORING RECOMMENDATIONS	Medium Priority – Collect samples to determine the effectiveness of water quality improvement actions. Collect selenium samples due to the exceedance. Collect core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limit for dissolved metals and selenium.

BIG CASA BLANCA CANYON From headwaters to Sonoita Creek 15050301 – 606 3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/03/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At long pool SCBCC006.33 103031	AGFD Ambient	2 total metal: Arsenic, barium, beryllium, cadmium, chromium, copper, manganese, nickel silver, and zinc. (Both sites sampled on same date)		
At frog pool SCBCC006.74 103032	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limits for selenium, mercury, and lead were higher than the applicable water quality criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limit for selenium, mercury, and lead.	

CARPENTER TANK 15050304 -- 0002 3 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 05/15/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake SCCAR-USGS 101582	USGS Ambient	1 dissolved metal only: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, uranium, and zinc. (0 total metals)	1 sample: Dissolved oxygen and pH	1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events.	
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period.	

CHIMENEA CREEK From headwaters to Rincon Creek 15050302 – 140 8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Inconclusive FC – Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/14/2002 – 10/31/2003; 09/14/2005 – 11/16/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Saguaro National Park SCCHM004.75 101593	USGS Ambient	0-1 total metals and 4-5 dissolved: Antimony, beryllium, boron, cadmium, chromium, copper, lead, manganese, and zinc. 0-1 total and 0-1 dissolved: Arsenic, barium, mercury, nickel, selenium, silver, uranium	1 samples: Ammonia, total nitrogen, nitrite/nitrate, total Kjeldahl nitrogen 3 samples: Dissolved oxygen 4 samples: Total phosphorus 7 samples: pH	1 Fluoride 4 Total dissolved solids 1 Suspended sediment concentration 1 Turbidity
Near Madrona Ranger Station SCCHM002.01 101584	USGS			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient total metals and *E. coli* bacteria to assess FBC and AgL.		Lab detection limit for selenium was higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limit for selenium.	

CIENEGA CREEK From headwaters to Gardner Canyon 15050302 – 006A 18.08 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/11/2000 – 03/20/2002; 09/27/2005 – 02/16/2006 (Included 02/16/2005 to have sufficient samples to assess designated uses)		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Cedar Canyon SCCIE026.68 101176	ADEQ Special study	14-15 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 15 total and 0-2 dissolved: Boron, manganese, mercury	10-13 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 14 Fluoride 14 Total dissolved solids 1 Suspended sediment concentration 14 Turbidity
At Stevenson Canyon SCCIE022.42 100266	ADEQ Ambient			
Below Pump Canyon SCCIE020.88 101177	ADEQ Special Study			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	09/27/2005 – 5.0 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling. Low nutrient levels. Flow 0.5 cfs.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters.		Lab detection limits for selenium and dissolved mercury and nickel were higher than the A&W chronic criteria in at least 5 samples.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limits for selenium, dissolved mercury, and dissolved nickel.	

CIENEGA CREEK From Gardner Canyon to USGS gage station (Pantano Wash) 15050302 – 006B 28.8 Miles Unique Water	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/12/2000 – 03/20/2002; 9/26/2005 – 2/14/2006 (Added in 2006 data to assess more uses) NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
SW of bench mark #3490 SCCIE006.69 101178	ADEQ Special study	10-14 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 14-15 total and 0-2 dissolved: Boron, manganese, mercury	13-14 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 14 Fluoride 14 Total dissolved solids 2 Suspended sediment concentration 15 Turbidity
Above Davidson Canyon SCCIE0004.25 101179	ADEQ Ambient and Special study			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	09/18/2001 – 5.4 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling. Low nutrient levels. Flow 0.7 cfs.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters.		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

COX GULCH From headwaters to Three R Canyon 15050301 – 560 16.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Impaired FC – Inconclusive AgL-- Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	Samples were collected on this reach in support of the Three R Creek TMDL. TMDL completed in 2003

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 01/11/2000 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below tributary to European Mine SCCXG000.81 100869	ADEQ TMDL	1 total and dissolved metal sample: Beryllium, cadmium, copper, and zinc	pH – 1 sample	

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Beryllium (total)	5.3 µg/L A&Ww chronic	01/10/2000 – 9.4 µg/L	Inconclusive – Exceeded in only sample collected.
Copper (total)	500 µg/L – AgL 1300 µg/L -- FBC	01/10/2000 – 18,000 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period. (Binomial)
Copper (dissolved)	49.6 µg/L at >400 mg/L hardness A&Ww acute	01/10/2000 – 18,000 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period.
Cadmium (dissolved)	19.1µg/L at >400 mg/L hardness A&Ww acute	01/10/2000 – 60 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period.
Zinc (dissolved)	379 µg/L at >400 mg/L hardness A&Ww acute	01/10/2000 – 11000 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period.
pH	<6.5 SU A&Ww, FBC, AgL	01/10/2000 – 3 SU	Remains impaired – Exceeded in only sample collected during this assessment period. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient monitoring events	
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional beryllium samples due to exceedance. Schedule follow up monitoring to determine effectiveness of improvements at mine sites in this watershed once improvements are completed. Collect missing core parameters to represent at least 3 seasons during an assessment period.	

UNNAMED TRIBUTARY TO COX GULCH From headwaters to Cox Gulch 15050301 – 890 1 miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	Samples were collected on this reach in support of the Three R Creek TMDL. TMDL completed in 2003

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data. Site file 100875				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	
MONITORING RECOMMENDATIONS		Medium Priority – Need to implement corrective actions at mine sites along this tributary and its tributaries and then do effectiveness monitoring.	

HARSHAW CREEK From headwaters to Sonoita Creek 15050301 – 025 14.4 miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired AgL – Impaired	Category 4A Not attaining	Copper and pH	TMDL completed in 2003 for copper, zinc and pH. Zinc delisted as a result.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data. Site files: 100318, 100319, and 100848				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	
MONITORING RECOMMENDATIONS		Medium Priority – Need to implement corrective actions at mine sites along Harshaw Creek and its tributaries and then do effectiveness monitoring.	

UNNAMED TRIBUTARY TO HARSHAW CREEK (Endless Chain Mine tributary) 15050301 – 888 2 miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired	Category 4A Not attaining	Copper and pH	Samples were collected on this reach in support of the Harshaw Creek TMDL. TMDL completed in 2003 for copper, pH and zinc. Zinc was delisted as a result.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data Site files: 100850, 100851				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Missing all core parameters	Insufficient sampling events	
MONITORING RECOMMENDATIONS		Medium Priority – Need to implement corrective actions at mine sites along this unnamed tributary and then do effectiveness monitoring.	

HUMBOLT CANYON From headwaters to Alum Gulch 15050301 – 340 2 miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Inconclusive	Category 4A Not attaining	Copper	Copper loading was assigned to this reach during the Alum Gulch TMDL.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data Site files:100840, 100841, and 100871				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	
MONITORING RECOMMENDATIONS		Medium Priority – Need to implement corrective actions at mine sites along Humboldt Canyon and its tributaries and then do effectiveness monitoring.	

KENNEDY LAKE 15050301 – 0720 10 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 07/18/2002; 09/19/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid Lake SCKEN-B 101052	AGFD Ambient	1 dissolved metals only: Cadmium, chromium, copper, lead, nickel, selenium and zinc. or mercury	2 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	2 Total dissolved solids

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect core parameters to represent at least three seasons during the assessment period. Use lower lab detection limit for selenium and dissolved mercury.	

LAKESIDE LAKE 15050302 -- 0760 15 Acres		USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Ww – Impaired PBC – Impaired FC – Inconclusive	Category 4A Not attaining (Impaired)	Ammonia, dissolved oxygen, and pH	TMDL completed in 2005 for nutrient related pollutants.
	EPA	A&Ww – Impaired PBC – Impaired FC – Inconclusive	Category 4A Not attaining	Chlorophyll, nitrogen, and phosphorus	TMDL completed in 2005 for nutrient related pollutants.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B & Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 01/09/2002 – 10/29/2003 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
At dam SCLAK-A 100034	ADEQ, U of A Ambient	1 dissolved and total metals: Cadmium, chromium, copper, lead, manganese, and zinc. 1 total metals only: Antimony, arsenic, barium, boron, lead, mercury, nickel, selenium, silver	46-55 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, pH	2 Fluoride 46 Total dissolved solids 46 Turbidity 46 Algal samples 46 Chlorophyll samples
Mid lake SCLAK-B 100035	ADEQ, U of A Ambient			
At boat ramp SCLAK-R 102294	U of A Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Ammonia	0.21 mg/L at pH 8.9 and 31.9 C A&Ww chronic	08/18/2003 – 0.43 mg/L	Remains impaired – 1 exceedance in the last 3 years of monitoring
Dissolved oxygen	6.0 mg/L A&Ww	07/18/2002 – 3.8 mg/L 08/12/2002 – 4.6 mg/L* 09/10/2002 – 5.3 mg/L* 05/01/2003 – 4.6 mg/L 06/11/2003 – 3.9 mg/L 06/18/2003 – 3.1 mg/L 06/26/2003 – 5.0 mg/L 08/11/2003 – 4.9 mg/L* 09/08/2003 – 3.9 mg/L	Remains impaired – Samples in 9 of 23 sampling events had low dissolved oxygen concentration. (Binomial) Conditions were generally the same at both site A and B. * Indicates that on these dates the dissolved oxygen was too low at 1 meter, but meeting standards at 0.5 meters or surface. Proposing changing designated use to "effluent dependent water, which has lower dissolved oxygen requirements.
pH	<9.0 SU A&Ww, PBC	08/12/2002 – 9.3 SU 08/27/2002 – 9.3 SU 09/25/2002 – 9.5 SU 10/09/2002 – 9.4 SU 10/24/2002 – 9.3 SU 08/11/2003 – 9.4 SU	Remains impaired – 6 of 23 sampling events had high pH values. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
	Insufficient core parameters	Insufficient sampling events	Lab detection limit for selenium and dissolved mercury were higher than A&W chronic criteria.
DISCUSSION OF IMPAIRMENT		Lake remains impaired due to ammonia, dissolved oxygen, and pH but is moved to Category 4A (from 5) due to completion of the nutrient TMDLs. Evidence of potential impairment by phosphorus, nitrogen, or chlorophyll: 1. Nutrient TMDL completed in 2005. Nutrient load reductions should address these pollutants; 2. Corrective actions are being taken by the City of Tucson to improve water quality at the lake; and 3. ADEQ has proposed narrative nutrient implementation guidance that indicates the following limits for an urban lake: Chlorophyll-a < 50 µg/L Total nitrogen <1.9 mg/L Total phosphorus < 0.160 mg/L At Lakeside Lake: Chlorophyll-a was above 50 µg/L on 12 dates. Nitrogen was routinely above 2.0 and as high as 5.9 mg/L. Phosphorus was routinely above 0.16 and as high as 0.51 mg/L	
MONITORING RECOMMENDATIONS		High Priority – Schedule follow-up monitoring to determine the effectiveness of water quality improvement actions taken at the lake. Collect core parameters to represent at least three seasons during an assessment period. Use lower lab detection limits for selenium and dissolved mercury.	

LOMA VERDE From headwaters to Tanque Verde Wash 15050302 – 268 4 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/14/2002 – 10/15/2003 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
In Saguaro National Park SCLMV003.51 101585	USGS Ambient	4 dissolved metals only: Antimony, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, silver, uranium, and zinc. 1 dissolved metals: Arsenic, selenium (0 total metals)	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total Kjeldahl nitrogen, total phosphorus, dissolved oxygen, and pH	4 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	05/14/2002 – 2.2 mg/L	Inconclusive – Only 1 of 4 samples did not meet criterion; however, nutrients were extremely high (15.2 mg/L nitrogen, 1.8 mg/L phosphorus).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient total metals and *E. coli* bacteria		
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen samples due to exceedance. Collect missing core parameters to represent at least 3 seasons during the assessment period.	

MADERA CANYON CREEK From headwaters to unnamed tributary at 314342/1105250 15050301 – 322A 2.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Inconclusive AgL -- Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/25/2001; 09/21/2005-01/09/2006 Included 01/09/2006 data to assess additional designated uses		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Sprung Spring SCMAD012.71 100588	ADEQ	3 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, copper, and zinc. 1-2 total and dissolved metals: barium, mercury, silver, thallium 3 total only: Boron, manganese 1 total and 3 dissolved: Lead	3 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 3 Fluoride 3 Total dissolved solids 2 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient total lead and mercury to assess FC and AgL.		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria in at least 1 sample.
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limit for selenium and dissolved mercury	

MADRONA CREEK From headwaters to Rincon Creek 15050302 -- 138 7 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/08/2002 – 10/31/2003; 09/14/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Madrona Ranger Station SCMDN001.51 101628	USGS Ambient	3-4 dissolved and 0-1 total metals: Antimony, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, and zinc. 0-1 total and 0-1 dissolved metals: Arsenic,, mercury, selenium, nickel, silver, uranium	1 samples: Ammonia, total nitrogen, nitrite/nitrate, total Kjeldahl nitrogen 2 samples: Dissolved oxygen 4 samples: Total phosphorus 7 samples: pH	1 Fluoride 3 Total dissolved solids 2 Suspended sediment concentration

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient total metals, *E. coli* bacteria, and dissolved oxygen to assess designated uses.		
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during the assessment period.	

NOGALES WASH From Mexico border to Potrero Creek 15050301 – 011 6.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired PBC – Impaired	Category 5 Impaired	*E. coli* bacteria, chlorine, ammonia, copper	On the 303(d) list due to *E. coli* bacteria, chlorine, ammonia, copper.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/07/2000 – 11/16/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Morley Street Tunnel SCNGW004.87 100251	ADEQ Ambient	17-25 dissolved and total metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, and zinc. 10-11 dissolved and total metals: Barium, nickel, silver, thallium 8 total only: Boron, manganese 1 Selenium	23-24 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	19 *E coli* bacteria 23 Fluoride 23 Total dissolved solids 12 Suspended sediment concentration 24 Turbidity 3 Solvents and petroleum products

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Ammonia	Varies based on pH and water temperature A&Ww chronic	08/09/2000 – 6.1 mg/L 04/23/2001 – 3.3 mg/L 01/15/03 – 13 mg/L 09/09/03 – 6.2 mg/L 01/14/04 – 3.6 mg/L 09/15/04 – 1.2 mg/L	Remains impaired – 4 exceedances in last 3 years of monitoring (6 in the assessment period).
Chlorine	11 µg/L A&Ww acute	03/07/2000 – 210 µg/L 05/24/2000 – 130 µg/L 08/09/2000 – 130 µg/L 04/24/2001 – 480 µg/L	Remains impaired -- Chlorine exceeded criterion all 4 times measured (4 times within a 3 year period). Chlorine is being added to the stream flow to reduce risks due to high bacterial contamination.
Copper (dissolved)	22.2 µg/L at 180 mg/L hardness A&Ww acute	01/15/2003– 24 µg/L	Remains impaired – One exceedance in last 3 years of monitoring.
Dissolved oxygen	6.0 mg/L A&Ww	12/19/2001 – 5.0 mg/L 09/09/2003 – 3.1 mg/L 12/01/2003 – 4.6 mg/L 01/14/2004 – 4.7 mg/L	Inconclusive – 4 of 22 samples did not meet the dissolved oxygen standards. Binomial method requires at least 5 exceedances to be listed as impaired with 22 samples.
E. coli bacteria	235 CFU/100 ml PBC	Too many exceedances to list here. Maximum was 4,810,000 CFU/100 ml	Remains impaired – 11 exceedances during the assessment period. (Noted fewer exceedances in 2004 and 2005.)
Lead	15 µg/L PBC	03/07/2000 – 190 µg/L 09/09/03 – 100 µg/L	Attaining – Only 2 exceedances in 22 samples. (Binomial)
Selenium	2 µg/L A&Ww chronic	09/09/2003 – 5.2 µg/L	Attaining – Only 1 exceedance in 23 samples. (Binomial)
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	09/09/2003 – 972 mg/L	Attaining – Criterion was exceeded once in 1 sample, but geometric mean was not exceeded. (The old turbidity standard (50) was exceeded in 5 of 24 samples.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Dissolved oxygen	**Collected all core parameters**		Lab detection limits for selenium and dissolved metals (lead, mercury, and nickel) were higher than the A&W chronic criteria in at least 3 samples.
COMMENTS CONCERNING EXCEEDANCES		Bacterial contamination and high ammonia levels are due to insufficient wastewater infrastructure in Mexico. The chlorine tablets are added to the stream to kill the bacteria; however, the chlorine is toxic to aquatic life.	
MONITORING RECOMMENDATIONS		High Priority – Collect samples to support TMDL development for *E. coli* bacteria, ammonia, chlorine, and copper. Collect dissolved oxygen samples due to exceedances. Use lower lab detection limit for selenium and dissolved metals.	

PARKER CANYON CREEK From Parker Canyon Dam to tributary at 312417 / 1102844 15050301 – 234A 3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/27/2005 – 12/07/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Parker Canyon Lake Dam SCPRK010.26 103524	ADEQ Ambient	1 total and dissolved metal samples: Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, and zinc	2 samples: Dissolved oxygen and pH 1 sample: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	2 *E. coli* bacteria 1 Fluoride 2 Total dissolved solids 2 Turbidity 2 Suspended sediment concentration

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	09/27/05 – 2.6 mg/L 12/07/2005 – 5.8 mg/L	Attaining – Low dissolved oxygen due to low flow conditions and groundwater upwelling. Flow around 0.2 cfs. Low nutrient levels.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limit for selenium was higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during the assessment period. Use lower lab detection limit for selenium.	

PARKER CANYON LAKE 15050301 – 1040 130 Acres		USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Inconclusive FBC – Attaining FC – Inconclusive AgI -- Attaining AgL -- Attaining	Category 2 Attaining Some Uses		
	E P A	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed mercury in 2004 due to fish consumption advisory

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B & Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/29/2000 – 11/22/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam SCPAK-A 100057	ADEQ Ambient	6-7 total and 4 dissolved: Cadmium, chromium, lead, nickel, zinc 7 and 1 dissolved metals: Antimony, arsenic, barium, beryllium, boron, copper, manganese, mercury	6-7 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 7 Fluoride 3 Total dissolved solids 7 Turbidity
At boat ramp SCPAK-D	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	<7.0 mg/L A&Wc	11/29/2000 – 6.5 mg/L 10/09/2003 – 5.1 mg/L 11/22/2005 – 6.2 mg/L	Inconclusive – Did not meet dissolved oxygen criteria in 3 of 6 sampling events. (Binomial requires a minimum of 5 exceedances and 20 samples to be listed as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen, mercury	Insufficient dissolved copper to assess A&W.		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury, and silver) and selenium were higher than the A&W chronic criteria in at least 1 sample.
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: 1. Mercury fish consumption advisory issued in 2002 still exists; and 2. Two other lakes in this watershed are impaired by mercury (Pena Blanca and Arivaca lakes) which may indicate common source contributions.	
MONITORING RECOMMENDATIONS		High Priority – Collect mercury samples to support TMDL development. Collect dissolved oxygen samples due low levels. Elevated turbidity and low dissolved oxygen may be symptoms of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Use lower lab detection limit for selenium and dissolved metals.	

PATAGONIA LAKE 15050301 – 1050 230 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining DWS -- Attaining AgI -- Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/28/2000 – 08/30/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam SCPAT-A 100060	ADEQ Ambient	4 total and 0-1 dissolved: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc	3-4 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	1 *E. coli* bacteria 3 Fluoride 1 Total dissolved solids 2 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	<7.0 mg/L A&Wc	08/30/2001 – 6.2 mg/L	Inconclusive – Did not meet dissolved oxygen criterion in 1 of 4 sampling events. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient metals (dissolved cadmium, copper, and zinc) and *E. coli* bacteria to assess A&W and FBC.		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect more total dissolved oxygen samples due to exceedance. Low dissolved oxygen may be a symptom of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Use lower lab detection limit for selenium and dissolved mercury.	

PENA BLANCA LAKE 15050301 – 1070 50 Acres	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Inconclusive FBC – Inconclusive FC – Impaired AgI -- Inconclusive AgL – Inconclusive	Category 4A Not attaining	Mercury in fish tissue	TMDL for mercury was completed in 1999.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIODS: 11/28/2000 – 08/28/2001; 09/18/2003; 01/08/2004 – 09/28/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam SCPEN-A 100064	ADEQ and U of A Ambient	7-11 total and 3-5 dissolved: Cadmium, chromium, lead, nickel, silver, thallium, zinc 7-11 total and 0-1 dissolved metals: Antimony, arsenic, barium, beryllium, boron, copper, manganese, mercury, selenium	12 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	2 *E. coli* bacteria 10 Fluoride 4 Total dissolved solids 10 Turbidity
At boat ramp SCPEN-FR 102761	AGFD Ambient			
Mid Lake SCPEN-B 100065	ADEQ and U of A Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	<7.0 mg/L A&Wc	09/12/03-09/18/03 – 2.5 mg/L	Inconclusive – Did not meet dissolved oxygen criterion in 1 of 8 sampling events (multiple sites). (Binomial)
pH	<9.0 SU A&Wc, FBC, AgI, AgL	09/28/2005 – 12.5 SU	Inconclusive – Did not meet pH criteria in 1of 6 sampling events (multiple sites). (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen, pH	Insufficient dissolved copper		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury, and silver) and selenium were higher than the A&W chronic criteria in at least 1 sample.

MONITORING RECOMMENDATIONS	
	Medium Priority – Collect samples to determine the effectiveness of TMDL load reduction strategies for mercury. Collect more total dissolved oxygen and pH samples due to exceedances. The old turbidity standard (10 NTU) was slightly exceeded on 2 dates. Low dissolved oxygen, high pH, and elevated turbidity may be symptoms of excess nutrient loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Use lower lab detection limit for selenium and dissolved metals.

POTRERO CREEK From Interstate 19 to Santa Cruz River 15050301 – 500B 4.9 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/25/2000 – 01/11/2006 Included 01/11/2005 data to be able to assess more designated uses.		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Ruby Road SCPOT001.62 100571	ADEQ and Friends of the Santa Cruz River	3 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, and zinc. 3 total only: Boron, manganese 2 total and 3 dissolved: Mercury 1 total and 3 dissolved: Lead, copper	17-23 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 2 Fluoride 3 Total dissolved solids 2 Suspended sediment concentration 19 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	11/16/2005 – 648 CFU/100 ml	Inconclusive – Only 1 exceedance within the assessment period (3 samples).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Insufficient dissolved and total copper, total lead, and total mercury to assess A&W, FC and AgL		Lab detection limits for selenium were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional *E. coli* bacteria due to the exceedance. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limit for selenium.	

REDROCK CANYON From headwaters to Harshaw Creek 15050301 – 576 12.7 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/13/2000 – 09/19/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Patagonia, AZ SCRED005.58 101080	ADEQ Ambient	4-5 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 4 total only: Boron, manganese 4 total metals only: Mercury	4 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	<6.0 mg/L A&Ww	09/19/2001 – 5.2 mg/L	Attaining -- Low dissolved oxygen is naturally occurring due to low flows and ground water upwelling. Very low nutrients.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limit for selenium and dissolved mercury.	

RINCON CREEK From headwaters to Pantano Wash 15050302 – 008 16.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&We – Inconclusive PBC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/25/2001; 09/21/2005-01/09/2006 Included 01/09/2006 data to assess additional designated uses		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Tucson, AZ SCRIN008.97 102170	AGFD Ambient	1 dissolved metal: Antimony, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, silver, and uranium. (0 total metals)	1 sample: Dissolved oxygen, pH	1 Suspended sediment

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period.	

ROSE CANYON LAKE 15050302 – 1260 7 Acres		USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining	Category 2 Attaining some uses		
	E P A	A&Wc – Impaired FBC – Impaired	Category 5 Impaired	pH	EPA added pH to 303(d) List in 2004 (Older data included in original listing)

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/04/2000 – 08/14/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam SCROS-A 100183	ADEQ Ambient	4 total metal samples: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc.	4 samples: Ammonia, total nitrogen, nitrate/nitrate, total phosphorus, total Kjeldahl nitrogen. 3 samples: Dissolved oxygen 5 samples: pH	1 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity
At top of lake inlet SCROS-IN 101266	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
pH	<6.5 SU A&Wc, FBC	06/27/2001 – 6.1-6.3 SU 08/14/2001 – 6.0-6.3 SU	Inconclusive – 2 low pH values in 3 sampling events (4 samples).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient dissolved metals and *E. coli* bacteria to assess A&W and FBC		

PH IMPAIRMENT DISCUSSION	Evidence of potential pH impairment: 1. All low pH values occurred below 4 meters deep in this seven acre lake, which may be associated with natural conditions; 2. No newer data since the original listing; and 3. A major wildfire occurred in this area in 2003 that may have further impacted water quality.
MONITORING RECOMMENDATIONS	High Priority – Collect additional pH to support TMDL Low pH and turbidity may be symptoms of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters.

SABINO CANYON From unnamed tributary at 322328 / 1104700 to Tanque Verde Wash 15050302 – 014B 14.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining DWS – Inconclusive AgI – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/14/2000 - 09/13/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above East Fork Sabino Canyon SCSAB009.77 100635	ADEQ Ambient	6-9 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 7 total and 0-1 dissolved: Boron, manganese, mercury 1 Selenium	8-9 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	4 *E. coli* bacteria 8 Fluoride 7 Total dissolved solids 1 Suspended sediment concentration 8 Turbidity 1 Cyanide
Above bridge 9 SCSAB007.15 102835	AGFD Ambient			
Near Tucson SCSAB005.40 101152	ADEQ Ambient			
Above bridge 1 SCSAB005.21 102834	ADEQ and AGFD Ambient			
At USGS gage SCSAB004.49 100260	USGS Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Cyanide	41 µg/L A&Ww acute	07/23/2003 – 120 µg/L	Inconclusive-- Exceeded in the only sample that was tested for cyanide. See "Aspen Fire" discussion below.
Dissolved oxygen	<6.0 mg/L A&Ww	09/20/2001 – 5.7 mg/L	Attaining – Low dissolved oxygen due to natural conditions. Very low flow (0.01 cfs) and ground water upwelling.
Lead	15 µg/L FBC and DWS	07/23/2003 – 202 µg/L 02/19/2004 – 1250 µg/L	Inconclusive – 2 exceedances in 8 samples. (Binomial method requires a minimum of 5 exceedances and 20 samples.) See "Aspen Fire" discussion below.
Manganese	980 µg/L DWS	07/23/2003 – 7820 µg/L	Attaining – Exceeded criteria in 1 of 7 samples (Binomial) Exceedance occurred immediately after "Aspen Fire" – see below.
Selenium	2.0 µg/L A&Ww chronic	07/23/2003 – 4.0 µg/L	Inconclusive – Exceeded in 1 sample during the last 3 years of monitoring. The lab detection limit on 6 other samples was above the criteria so could not be used to determine attainment. See "Aspen Fire" discussion below.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Cyanide	**Collected all core parameters**		Lab detection limits for dissolved mercury and selenium were above the A&Ww chronic criteria.
ASPEN FIRE of 2003		A major wildfire burned 84,750 acres in the Coronado National Forest, including a major portion of Sabino Canyon's watershed. The fire started on 06/17/2003. Samples collected on 07/23/2003 reflect the impact of this fire on water quality with exceedances of cyanide, lead, manganese, and selenium criteria. The old turbidity criterion (50 NTU) was also exceeded on 07/23/2003 at 2800 NTU. Subsequent monitoring on 02/19/2004 and 09/13/2005 contained only a lead exceedance.	
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional cyanide, lead, manganese, and selenium samples due to exceedances to determine any long term impacts of the fire. Use lower lab detection limits for dissolved mercury and selenium. Longer term impacts of erosion and sedimentation should be studied. Collect suspended sediment concentration (SSC) samples. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

SANTA CRUZ RIVER From headwaters to Mexico border 15050301 – 268 13.9 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining DWS -- Attaining AgI -- Attaining AgL -- Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/13/2000 – 09/19/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Lochiel SCSCR169.35 100242	ADEQ Ambient	4 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 4 total metals only: Boron, manganese, mercury	4 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limit for selenium and dissolved mercury.	

SANTA CRUZ RIVER From Mexico border to Nogales Intl WWTP discharge 15050301 – 010 17.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Attaining FBC – Impaired FC – Inconclusive AgI -- Attaining AgL – Attaining	Category 5 Impaired	*E. coli* bacteria	Listed due to *E. coli* bacteria since 2002. TMDL has been delayed because drought has resulted in no stream flow.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/25/2000 – 12/09/2001 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
At International boundary with Mexico SCSCR128.27 100239	ADEQ Ambient	7-8 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 8 total metals only: Boron, manganese, mercury	15-17 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	8 *E. coli* bacteria 8 Fluoride 8 Total dissolved solids 18 Turbidity
At Guavai Ranch SCSCR119.01 100246	ADEQ and Friends of the Santa Cruz River Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	<6.0 mg/L A&Ww	02/29/2000 – 5.5 mg/L 05/24/2000 – 5.4 mg/L 08/09/2000 – 4.3 mg/L	Attaining -- Low dissolved oxygen levels are naturally occurring due to ground water upwelling and low flows was less than 0.5 cfs.
E. coli bacteria	235 CFU/100 ml FBC	08/09/2000 – 10,000 CFU/100 ml	Remains impaired – One exceedance last 3 years monitored.
Mercury	0.6 µg/L FC	09/18/2000 – 0.8 µg/L	Inconclusive -- 1 exceedance in 8 samples. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Collected all core parameters		Lab detection limits for selenium and dissolved metals (lead, mercury, and nickel) were higher than the A&W chronic criteria.

MONITORING RECOMMENDATIONS	
	High Priority – Collect *E. coli* bacteria samples to support TMDL development. Collect mercury samples due to exceedance. Use lower lab detection limit for selenium and dissolved metals. The old turbidity standard (50 NTU) was exceeded in 2 samples out of 11 (53 and 100 NTU). Collect SSC samples to determine if excessive suspended sediment is occurring. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.

SANTA CRUZ RIVER From Nogales Intl WWTP discharge to Josephine Canyon 15050301 – 009 9.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wedw – Inconclusive PBC – Attaining AgL -- Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/25/2000 – 11/15/2005 (Full suite only on 09/21/2005) NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Rio Rico SCSCR111.66 100238	ADEQ and Friends of the Santa Cruz River Ambient	1 dissolved and total metals: Antimony, arsenic, cadmium, and zinc. 1 total only: Beryllium, boron, manganese 1 dissolved only: Chromium, copper, lead 4 total metals only: Mercury	17-32 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 1 Suspended sediment concentration 34 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient dissolved and total metals.	Insufficient sampling events.	Lab detection limits for selenium were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for selenium.	

SANTA CRUZ RIVER From Josephine Canyon to Tubac Bridge 15050301 – 008A 4.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wedw – Inconclusive PBC – Attaining AgL -- Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/25/2000 – 10/01/2001; 09/29/2004 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
At Santa Gertrudis Lane SCSCR103.45 100247	ADEQ and Friends of the Santa Cruz River Ambient	4 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 4 total metals only: Boron, manganese, mercury	20-24 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 35 Turbidity 2 Chlorine (free residual)
At Tubac, AZ SCSCR103.39 USGS #09481740 101002	ADEQ Special Inv			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Chlorine	11 µg/L – A&Wedw acute	02/27/2001 – 90 µg/L	Inconclusive – One of 2 chlorine residual samples exceeded water quality criterion.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Chlorine	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect more total chlorine residual samples due to exceedance. Use lower lab detection limit for selenium and dissolved mercury.	

SANTA CRUZ RIVER From Tubac Bridge to Sopori Wash 15050301 – 008B 8.9 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&We – Inconclusive PBC – Inconclusive AgL -- Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/25/2000 – 09/29/04; 09/21/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Tubac Bridge SCSCR099.40 100243	ADEQ and Friends of the Santa Cruz Ambient	1 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, and zinc. 1 total only: Boron, manganese, selenium	18-46 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	1 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 1 Suspended sediment concentration 44 Turbidity
North of Chaves Siding Road SCSCR096.72 100244	ADEQ and Friends of the Santa Cruz Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	09/21/2005 – 650 CFU/100 ml	Inconclusive – Criterion exceeded in the only sample tested. Sample had very high nutrient levels, and site is just downstream of where the Effluent Dependent Water classification ends.
pH	<6.5 SU A&We, PBC, AgL	02/29/2000 – 2.6 SU	Attaining – Only 1 exceedance in 46 samples. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Insufficient core parameters	Insufficient sampling events.	
MONITORING RECOMMENDATIONS		Medium Priority – Collect more *E. coli* bacteria samples due to exceedance. Collect missing core parameters to represent at least 3 seasons during an assessment period.	

SANTA CRUZ RIVER From Canada del Oro to HUC boundary 15050301 15050301 – 001 8.6 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wedw – Inconclusive PBC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIODS: 01/03/2001 – 10/02/2001; 09/12/2005 – 11/15/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Marana SCSCR034.56 101081	ADEQ Ambient	4-5 dissolved and total metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 5 total only: Boron, manganese 5 total metals only: Mercury	5 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	4 *E. coli* bacteria 5 Fluoride 5 Total dissolved solids 1 Suspended sediment concentration 4 Turbidity 3 Chlorine (free residual)

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Chlorine	11 µg/L A&Wedw acute	02/26/2001 –480 µg/L 10/02/2001 –70 µg/L	Inconclusive – 2 exceedances in a 3-year period; however, wastewater treatment facility had a permit variance at the time.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Chlorine	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect more total chlorine residual samples due to the exceedance. Use lower lab detection limit for selenium and dissolved mercury.	

SONOITA CREEK From 750 feet below Patagonia WWTP discharge to Patagonia Lake 15050301 – 013C 9.03 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Attaining FC – Attaining AgI -- Attaining AgL -- Attaining	Category 5 Impaired	Zinc and low dissolved oxygen	Added zinc to 303(d) list in 2004. Moved low DO from 4B back to 5

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD 12/12/2000 – 09/19/2001; 09/28/2005 – 12/08/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Circle Z Ranch SCSON014.52 101154	ADEQ Ambient	4-5 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 4 total and 0-1 dissolved: Boron, manganese, mercury	5 samples: Ammonia, dissolved oxygen, pH, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen	6 *E. coli* bacteria 5 Fluoride 6 Total dissolved solids 1 Suspended sediment concentration 6 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Zinc	379 µg/L at >400 hardness A&Ww acute	12/12/2000 – 800 µg/L 04/13/2001 – 860 µg/L 09/28/2005 – 760 µg/L	Remains impaired -- Two exceedances in a 3 year period (2000-2001) Site is downstream of a WWTP discharge and downstream of several historic mining sites.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria.
LOW DISSOLVED OXYGEN IMPAIRMENT		Low dissolved oxygen is occurring in the reach just below the reach receiving Patagonia's WWTP effluent discharge. The discharge rapidly goes subsurface. ADEQ is lengthening the reach designated as A&Wedw to include the site where low dissolved oxygen was measured.	
MONITORING RECOMMENDATIONS		High Priority – Collect zinc samples to support TMDL development. Collect dissolved oxygen samples in the reach below the proposed EDW. Use lower lab detection limit for selenium and dissolved mercury.	

SYCAMORE CANYON From headwaters to Mexico border 15080200 -- 002 9.9 miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive AgL -- Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 04/24/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Penasco Canyon SCSYR004.21 100660	ADEQ Ambient	1 dissolved and total metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc. 1 total metals only: Boron, manganese, mercury,	1 sample: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, pH	1 Fluoride 1 Total dissolved solids 1 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limits for selenium and dissolved mercury are higher than the A&Ww criteria.
MONITORING RECOMMENDATIONS		Low Priority –Collect core parameters to represent at least three seasons during an assessment period. Use lower lab detection limits for selenium and dissolved mercury.	

THREE R CANYON From headwaters to 312835 / 110 4619 (latitude/longitude where intermittent flow begins) 15050301 – 558A 2.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired AgL – Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	TMDL completed in 2003. Need to implement improvements at mining sites.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE:		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data Data files: 100852				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters		
MONITORING RECOMMENDATIONS		Low Priority – Additional monitoring should be scheduled to determine effectiveness of improvements at mine sites in this watershed once improvements are completed.	

UNNAMED TRIBUTARY TO THREE R CANYON From headwaters to Three R Canyon 15050301 – 889 2 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	TMDL completed in 2003. Need to implement improvements at mining sites.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE:		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data Data file: 100874				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters		
MONITORING RECOMMENDATIONS		Low Priority – Additional monitoring should be scheduled to determine effectiveness of improvements at mine sites in this watershed once improvements are completed.	

THREE R CANYON From 312835 / 110 4619 to 312827 / 1104712 (intermittent flow) 15050301 – 558B 1 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired FC -- Inconclusive AgL -- Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	TMDL completed in 2003. Need to implement improvements at mining sites.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 01/11/2000		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below uppermost spring SCTHC003.83 100872	ADEQ TMDL	1 total and dissolved metal sample: Beryllium, cadmium, copper, and zinc	pH – 1 sample	

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper	500 µg/L – AgL 1300 µg/L – FBC	01/11/2000 – 50,000 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period. (Binomial)
Copper (dissolved)	8.7 µg/L at 63 mg/L hardness A&W acute	01/11/2000 – 49,000 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period.
Cadmium (dissolved)	2.6 µg/L at 63 mg/L hardness A&W acute	01/11/2000 – 47 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period.
Zinc (dissolved)	79 µg/L at 63 mg/L hardness A&W acute	01/11/2000 – 1400 µg/L	Remains impaired – Exceeded in only sample collected during this assessment period.
pH	<6.5 SU A&Ww, FBC, AgL	01/11/2000 – 2.9 SU	Remains impaired – Exceeded in only sample collected during this assessment period. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient monitoring events	
MONITORING RECOMMENDATIONS		Medium Priority – Collect samples during critical conditions to determine effectiveness of improvements at mine sites in this watershed once improvements are completed. Collect missing core parameters to represent at least 3 seasons during an assessment period.	

THREE R CANYON From 312827 / 1104712 to Sonoita Creek (ephemeral segment) 15050301 – 558C 3 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&We – Impaired PBC – Impaired AgL – Impaired	Category 4A Not attaining	Cadmium, copper, zinc, and pH	TMDL completed in 2003. Need to implement improvements at mining sites.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data				

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters		
MONITORING RECOMMENDATIONS	Low Priority – Collect samples during critical conditions determine effectiveness of improvements at mine sites in this watershed once improvements are completed. Collect missing core parameters to represent at least 3 seasons during an assessment period.		